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United States
Department of
Agriculture

Forest Service

Pacific Northwest
Research Station

Research Paper
PNW-354

March 1986



KENTUCKY'S Forest Products Industry: Performance and Contribution to the State's Economy, 1970 to 1980

Con H Schallau, Wilbur R. Maki, Bennett B. Foster, and Clair H. Redmond



PSW FOREST AND RANGE
EXPERIMENT STATION

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Abbreviations

States

AL	Alabama
AR	Arkansas
FL	Florida
GA	Georgia
KY	Kentucky
LA	Louisiana
MS	Mississippi
NC	North Carolina
OK	Oklahoma
SC	South Carolina
TN	Tennessee
TX	Texas
VA	Virginia
SO	South
US	United States

Industries

FPI	Forest Products Industry
LWP	Lumber and Wood Products
PAP	Paper and Allied Products
WF	Wood Furniture

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Abstract

Schallau, Con H; Maki, Wilbur R.; Foster, Bennett B.; Redmond, Clair H.

Kentucky's forest products industry: performance and contribution to the state's economy, 1970 to 1980. Res. Pap. PNW-354. Portland, OR: U.S. Department of Agriculture, Forest Service, Pacific Northwest Research Station; 1986. 22 p.

Employment and earnings in Kentucky's forest products industry, like those of most Southern States, grew significantly between 1970 and 1980. In fact, Kentucky's share of the Nation's forest products employment and earnings increased during this period. In 1980, lumber and wood products accounted for the largest share of the industry's employment, but paper and allied products had more earnings. Furthermore, in 1977, pulp and allied products had higher productivity than either lumber and wood products, or wood furniture.

Keywords: Forest products industries, economics (forest products industries), Kentucky.

Preface

Kentucky's forest products industry, with the exception of wood furniture, experienced significant growth during the 1970's. This resurgence resulted from the increasing size and amount of timber, investment in new plants and equipment, and a growing demand for Kentucky's forest products.

This report briefly describes Kentucky's forest products industry—its composition, location, evolution, and relation to economic activity elsewhere in the State, the South, and the Nation.

Estimates of employment and earnings shown in this report were derived from U.S. Department of Commerce data. All references to dollar amounts are in constant 1977 dollars.

This is one in a series of reports for each of the 13 Southern States. These reports are companions to an analysis of the changing roles of the forest products industries of the South and the Pacific Northwest.

Highlights

- In the State's nonmetropolitan substate planning and development districts, the forest products industry is an important basic industry.
- During the 1970's, Kentucky increased its share of the Nation's forest products industry employment and earnings. Forest products industry employment increased by 12 percent between 1970 and 1980. This rate was three times that for the Nation and fifth highest among the 13 Southern States.
- Lumber and wood products is the largest component of the State's forest products industry in terms of employment and a close second to paper and allied products in terms of earnings.
- Paper and allied products accounted for the majority of value added in 1977 and was the fastest growing segment of Kentucky's forest products industry in terms of employment and earnings.

- In 1980 average annual earnings of Kentucky's forest products industry was equal to the average for the South, but lower than the national average. The difference was particularly significant with regard to paper and allied products. For this segment of the forest products industry, Kentucky's earnings were 11 percent less than the average for the Nation. This differential, of course, provides Kentucky with a comparative advantage in a very competitive industry.
- Between 1972 and 1977, productivity of Kentucky's forest products industry (measured in terms of value added minus payroll, per worker hour) increased by nearly one-third. This rate of change exceeded the average for all Southern States. In fact, Kentucky tied for fifth place among the 13 Southern States.
- In 1977, productivity of paper and allied products was twice that of the average for the State's forest products industry. Between 1972 and 1977, it also exhibited a greater increase in productivity.

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**The Forest Products
Economy of
Kentucky
The State's Workforce**

Kentucky's estimated full- and part-time workforce in 1980 was comprised of an estimated 1.5 million employees and proprietors (see appendix tables for sources of employment and earnings data). Kentucky's workforce grew slightly slower between 1970 and 1980 than did the national average (20.2 percent versus 22.3 percent), but total earnings—wage and salary payments and proprietorial income—grew faster than the national average. Measured in constant 1977 dollars, the State's earnings increased by 30.6 percent as compared to 27.4 percent for the Nation. As can be seen in the following tabulation, manufacturing, services, retail trade, and State and local government were the State's four largest employer categories.

<u>Employers</u>	<u>Percent of total employment, 1980</u>	
	<u>Kentucky</u>	<u>U.S.</u>
Major industries:		
Manufacturing (including the forest products industry)	17.88	19.15
Services	14.61	18.22
Retail trade	12.88	14.18
State and local government	11.91	12.56
Agriculture	9.98	4.39
Nonfarm proprietors	7.55	6.58
Transportation, communication, and public utilities	4.53	4.84
Wholesale trade	4.00	4.97
Construction	3.75	4.08
Federal military	3.50	2.30
Subtotal	90.59	91.27
All other industries	9.41	8.73
Total	100.00	100.00

Components of the State's Economic Base

Along with total employment there is another and perhaps more important way to judge an industry's contribution to Kentucky's economy. For the State's economy to grow and develop, it must attract new dollars so residents can buy goods and services produced elsewhere. The industries that export products and services beyond local boundaries (that is, to elsewhere in the State, to other States, and to the world) and bring in new dollars, constitute the area's economic base. Generally speaking, most manufacturing employment is classified as "economic base" (or "basic"), while service or residentiary employment (for example, barber shops, realty firms, schools, and local government) is primarily geared to producing for local needs. Some services however, may be basic. The federal military, for example, provides national defense services for all of the Nation's citizens. Furthermore, taxpayers outside Kentucky help support this activity; consequently, Federal military qualifies as a basic industry.

Residentiary employment is supported by the economic base. Money flowing in provides income for wage earners and entrepreneurs to spend on locally purchased goods and services. In most cases, the economic growth of a region is dependent upon the success of its economic base.

We used the excess employment technique to identify the industries that comprise Kentucky's (or a substate district's) economic base. This approach accepts the national distribution of employment among industries as a norm. Any industry with employment in excess of this norm is considered to be producing for export markets outside the State (or substate district) and is part of Kentucky's economic base. The percentage of Kentucky's excess employment served as an indicator of the State's dependency on a particular industry for generating new dollars from outside the State. The percentage associated with the forest products industry is defined as the timber-dependency indicator. Table 2 shows how excess employment and industry dependency indicators for Kentucky were calculated. A particular industry may be basic at the local level but not at the state level.

In 1980, ten industries accounted for 98 percent of the State's excess employment—that is, its economic base (see tabulation below). Though these same industries accounted for only a slightly smaller share (97.75 percent) in 1970, the change in shares of certain individual industries is noteworthy. Agriculture is the largest component of the State's economic base. By the end of the 1970's agriculture was, however, considerably less important than at the beginning. On the other hand, the State's second largest basic industry—coal mining—experienced a sizeable gain in importance, reflecting the Nation's attempts to achieve energy self-sufficiency.

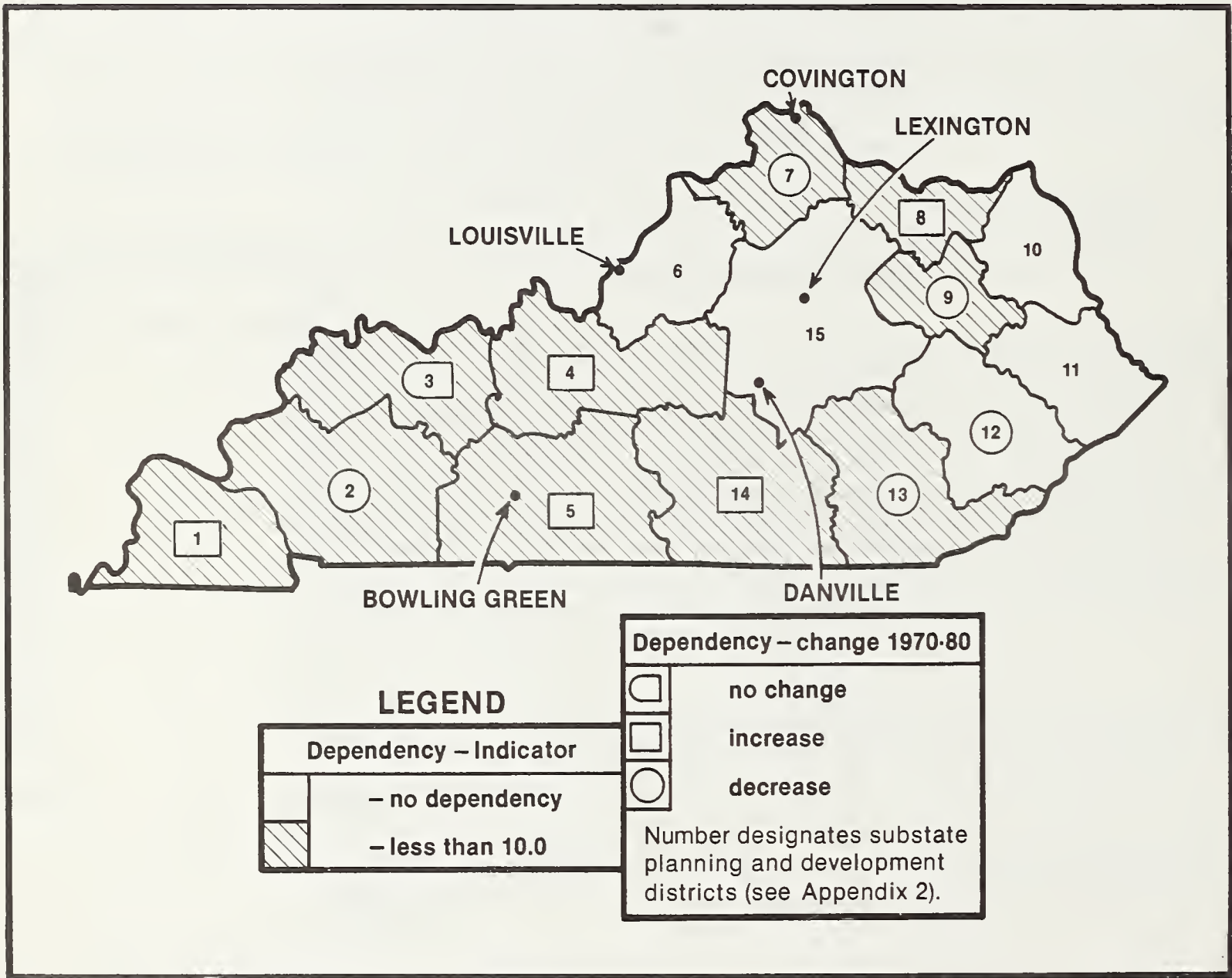
Crosshauling of goods and services among States and regions can influence the importance of a particular industry; for example, an industry may be exporting beyond a State's boundaries at the same time its products are being imported from outside the State. If the dollar value of imported goods or services equals or exceeds that produced locally, the industry does not qualify as basic because this industry is not earning net new dollars from the outside world. It is common for a local industry to produce in excess of local needs while the State must import more of the same to satisfy all of its requirements. An example is Kentucky's forest products industry. Hardwood products are exported to customers outside Kentucky, while the State imports larger amounts of softwood lumber and paper products. At the state level the forest products industry therefore does not account for any of Kentucky's excess employment. We take this to mean that Kentucky is a net importer of forest products. We shall see later that the forest products industry is, however, an important basic industry in most of the State's rural substate districts.

<u>Economic base industries</u>	<u>Dependency indicator</u>	
	<u>1970</u>	<u>1980</u>
	(Percent of economic base)	
Agriculture	53.00	43.14
Coal mining	11.22	21.34
Federal military	9.01	8.92
Nonfarm proprietors	5.95	7.06
Tobacco	6.75	4.54
Apparel and other textiles	3.56	4.51
Railroad transportation	3.70	4.31
Electrical machinery	4.56	2.39
Machinery, except electrical	—	1.27
Primary metals	—	.83
Subtotal	97.75	98.31
All other basic industries	2.25	1.69
Total	100.00	100.00

**Geographical
Importance of the
State's Forest Products
Industry**

Although the forest products industry^{1/} does not qualify as a basic industry for the State as a whole, this industry is an important component of the economic base of most substate districts (see Appendix 2 for a listing of counties by district). Generally speaking, the forest products industry is less important in those portions of the State dominated by metropolitan areas. Timber dependency changed in several substate areas: five were more dependent and five were less dependent in 1980 than in 1970.

^{1/} For the purposes of this analysis, the forest products industry is comprised of (1) lumber and wood products (SIC 24), except mobile homes (SIC 2451); and (2) wood furniture manufacturing (SIC 2511, 2512, 2517, 2521, 2541) and paper and allied products (SIC 26).

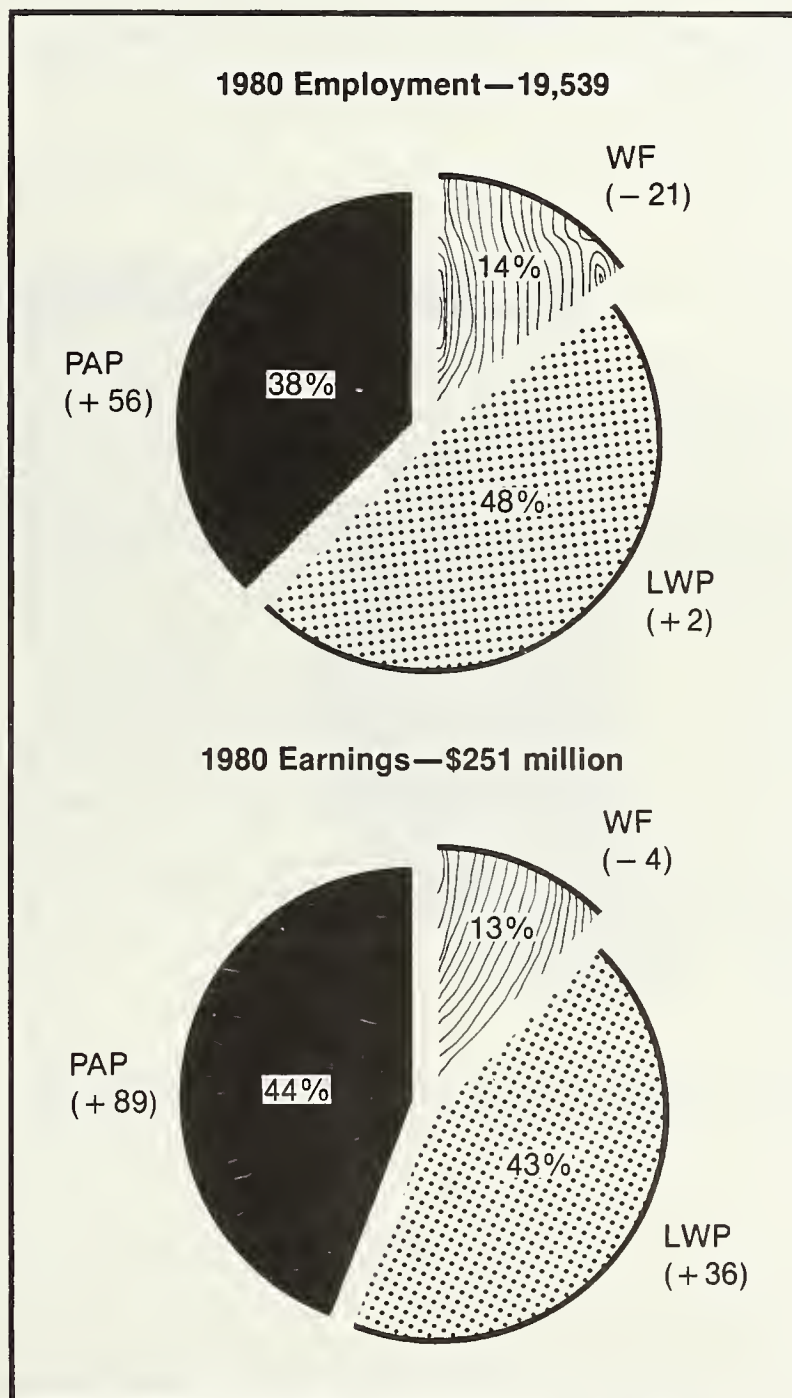


Source: Substate estimates for 1970 and 1980 were derived from unpublished county data series provided by the U.S. Department of Commerce, Regional Economic Information System, Washington, DC; and from the Department's *County Business Patterns*. The numbers used to designate substate districts correspond to the geographical classification of counties as shown in Appendix 2.

Composition of the State's Forest Products Industry

Kentucky's forest products industry is comprised of paper and allied products, lumber and wood products (not including mobile homes), and wood furniture. In 1980, lumber and wood products accounted for the largest share of approximately 20,000 workers employed by Kentucky's forest products industry. Paper and allied products also had a slightly larger share of 1980 earnings.

Paper and allied products employment increased substantially during the 1970's. In fact, growth in this segment was significantly greater than the average for all industries in the Nation (22.3 percent). Meanwhile, employment in wood furniture, which is the smallest component of the forest products industry in Kentucky, dropped significantly between 1970 and 1980. During this period, earnings also decreased for wood furniture. Earnings in the other two components increased much more rapidly than the average for all industries (27.4 percent).

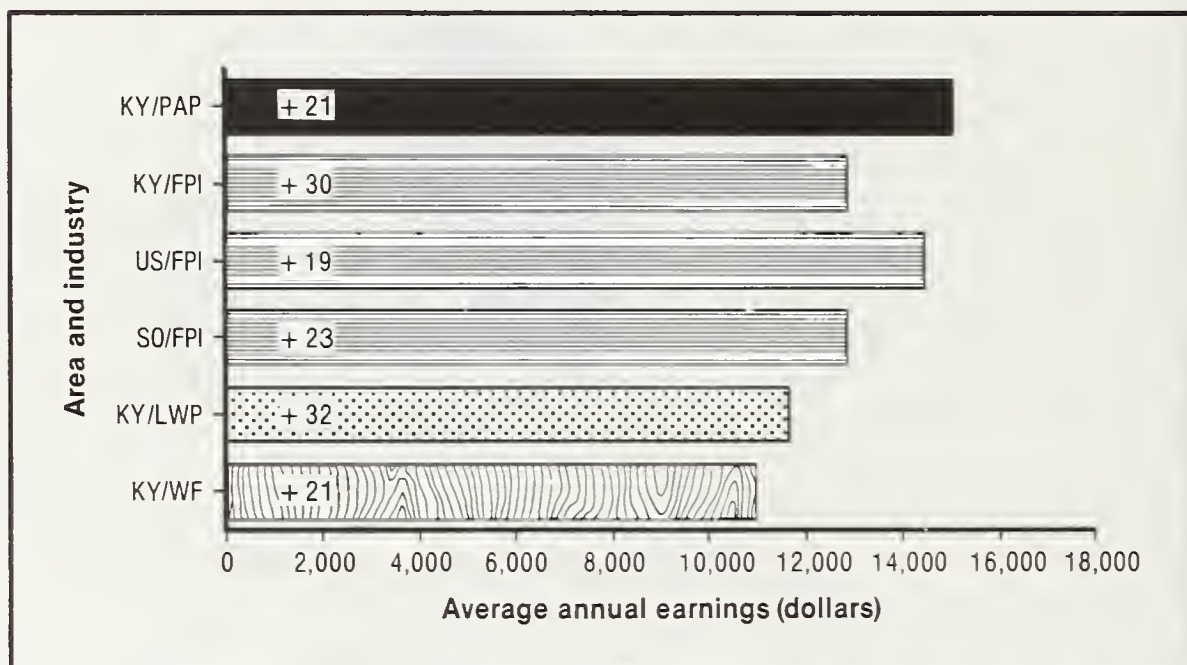


Numbers in parentheses show percentage of change from 1970 to 1980.

Average Annual Earnings per Worker

Average annual 1980 earnings per worker in paper and allied products were greater than were earnings in the other two components. Higher average skill levels, capital investment per worker, and unions account for this difference. Earnings in wood furniture were nearly 30 percent less than those for paper and allied products, and significantly below the average for all forest products industries in the South and the United States.

Average annual earnings in Kentucky's forest products industry were nearly the same as the average for the South. Growth in earnings was much greater for Kentucky than for the South and the Nation. Growth of earnings for lumber and wood products was nearly a third greater than for either of the remaining components in Kentucky, the South, and the United States.

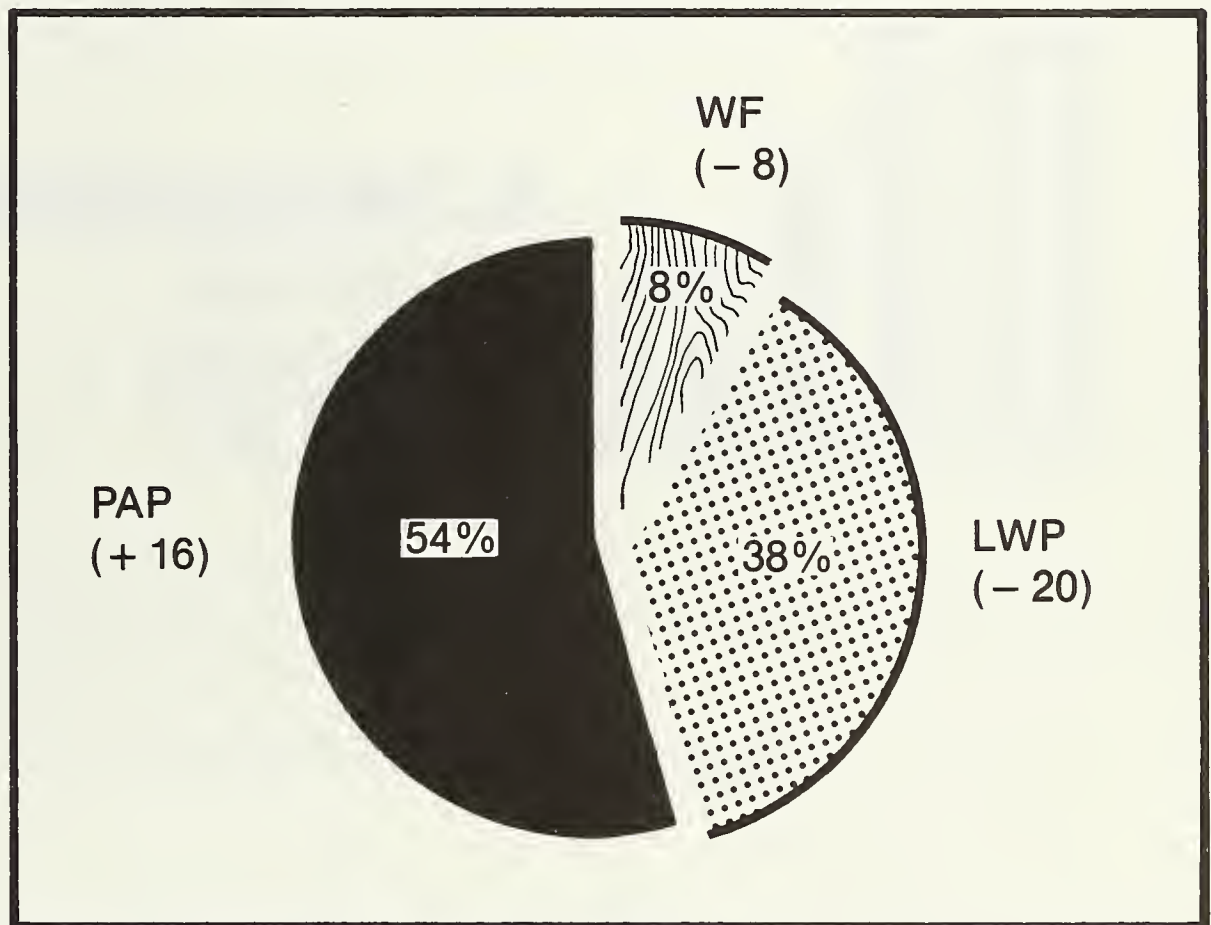


Numbers in bars show percentage of change from 1970 to 1980.

Value Added by the Forest Products Industry

Value added by manufacturing represents income payments made directly to workers and business owners. It is equal to the value of shipments less the cost of materials, parts, supplies, fuel, goods purchased for resale, electric energy, and contract work. Unlike value of shipments, value added avoids double counting. Consequently, value added by manufacturing is considered the best monetary gauge of the relative economic importance of a manufacturing industry.

In 1977, paper and allied products accounted for more than half of the \$353 million of the value added by Kentucky's forest products industry. Between 1972 and 1977, the value added by paper and allied products grew. Value added decreased in the wood furniture and the lumber and wood products industries.

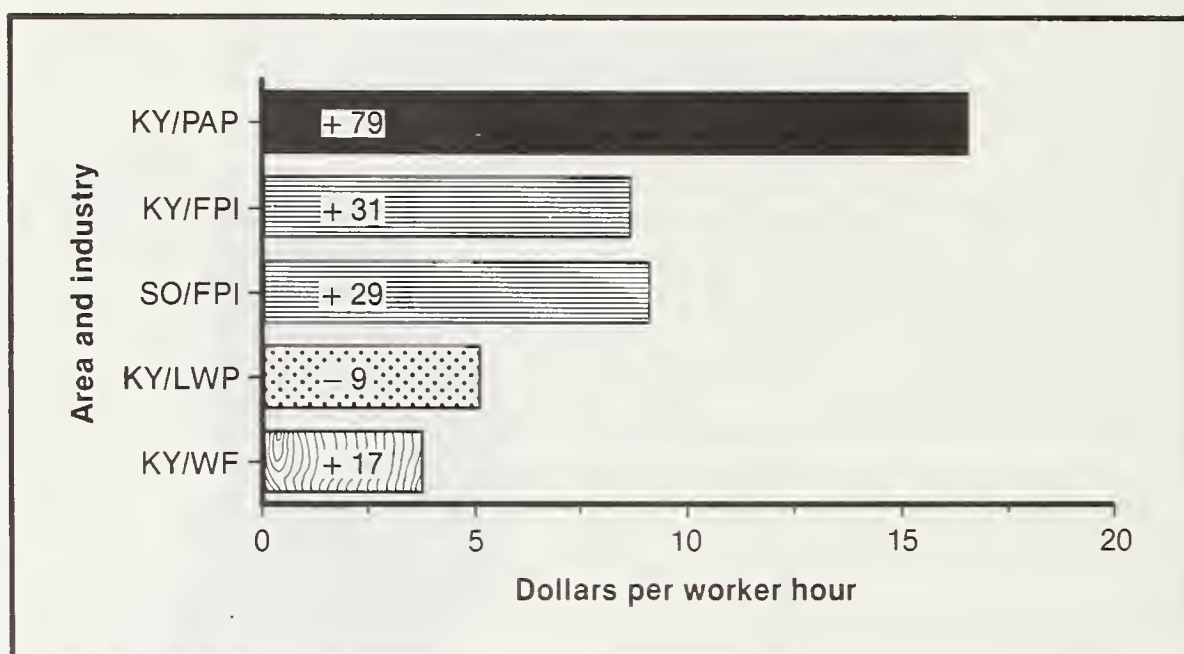


Numbers in parentheses show percentage of change from 1972 to 1977.

Capital Productivity

Increases in productivity are necessary for an industry to remain competitive in the marketplace. Capital productivity of an industry is measured in terms of value added less payrolls per worker hour—VAMP (see table 3 for an explanation of how capital productivity was calculated for Kentucky's forest products industry). This measure of productivity adjusts for wide differences in payroll among industries and represents the return to capital investment and entrepreneurship.

Not surprisingly, paper and allied products had by far the highest productivity in Kentucky's forest products industry. Productivity per worker hour was twice the average for the State's forest products industry. Paper and allied products is more capital intensive and in the past has attracted considerable investment in new facilities and equipment. During the mid-1970's, this component exhibited a larger gain in productivity than did either wood furniture or lumber and wood products.

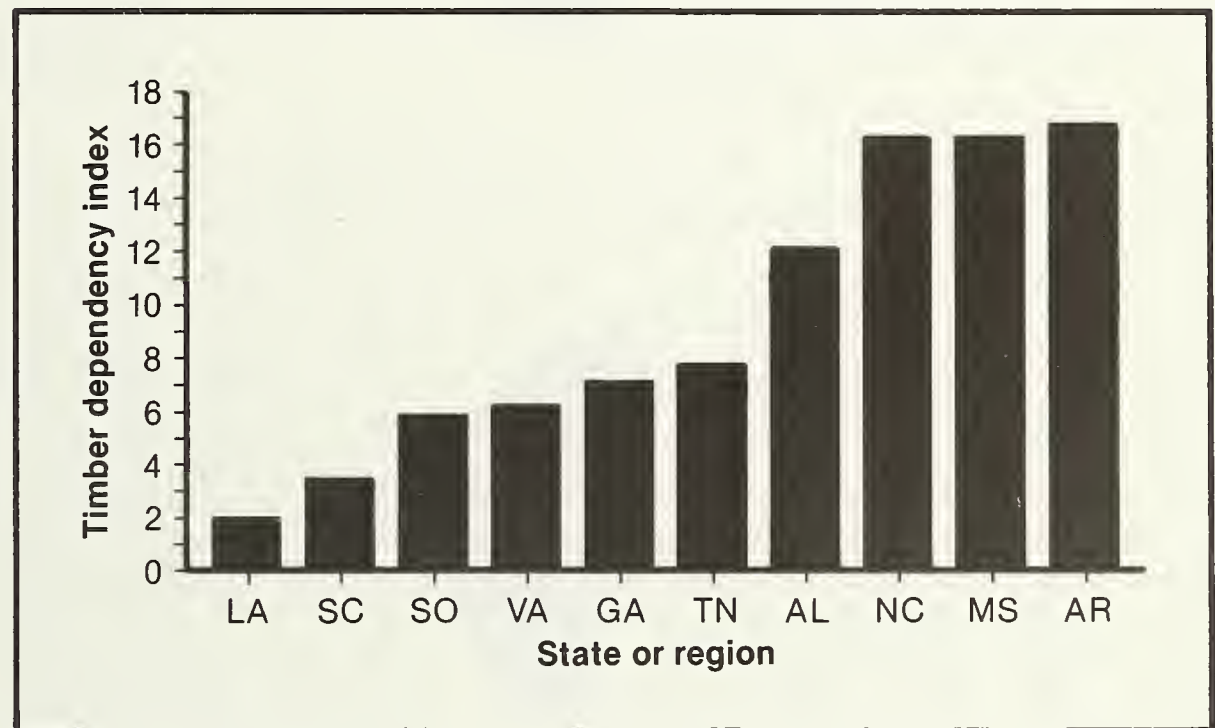


Numbers in bars show percentage of change from 1972 to 1977.

The Forest Products Industry in the South

Importance of the Industry Across the South

The dependency indicators suggest that in 1980 all but four States in the South manufactured forest products in excess of statewide needs. Kentucky, in addition to Florida, Oklahoma, and Texas, was not self-sufficient with respect to forest products. That is, these States imported more forest products, in terms of value, than they exported. Consequently, on net balance, their respective forest products industries did not generate new dollars from the outside. On the other hand, in three States—Arkansas, Mississippi and North Carolina—the forest products industry accounted for approximately 1 out of 6 basic employees.



Industry Composition

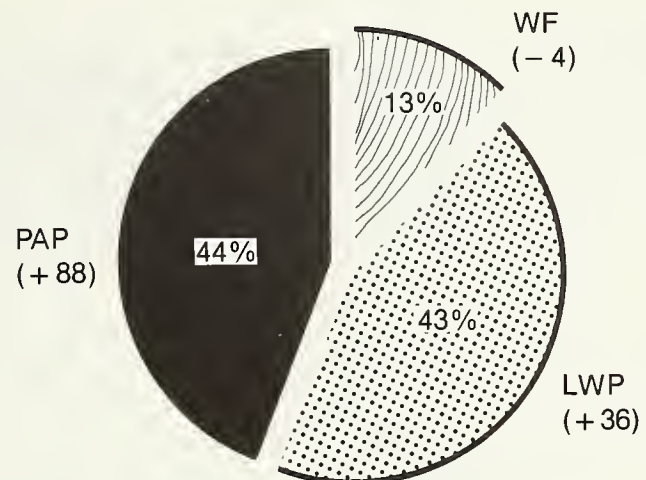
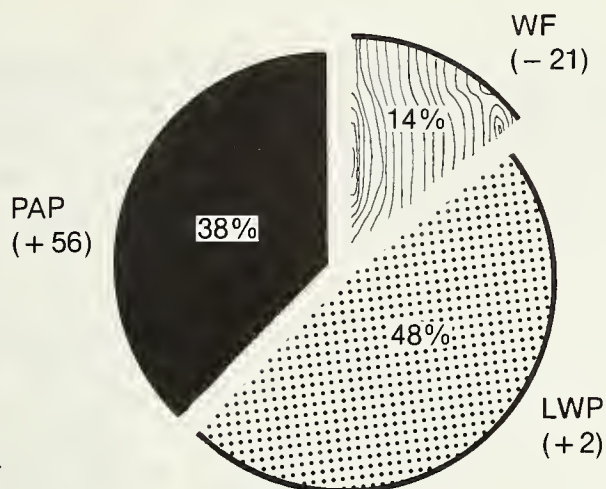
Lumber and wood products accounted for a larger share of Kentucky's 1980 forest products industry employment than it did for either the South or the Nation. Although paper and allied products employment was less important in Kentucky than for the Nation, its growth in Kentucky was much greater than in either the South or the Nation.

In terms of earnings, the composition of Kentucky's forest products industry closely resembled that of the Nation, but growth in earnings in lumber and wood products and paper and allied products—particularly the latter—was more than for the Nation. The more limited importance—in terms of both employment and earnings—and the negative growth of earnings distinguished Kentucky's wood furniture manufacturing from both the South and the Nation.

KENTUCKY

1980 Employment—19,539

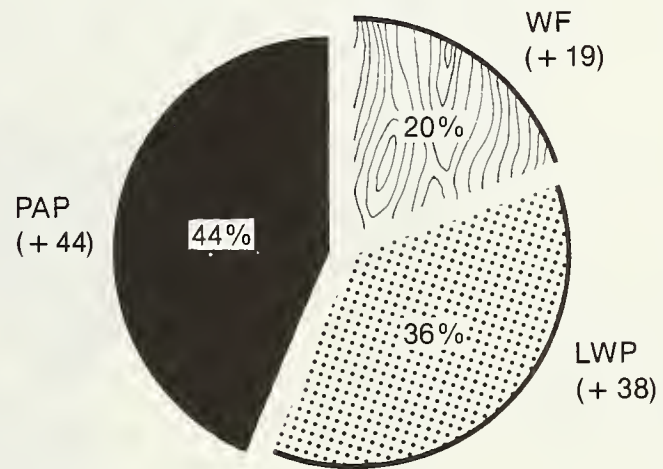
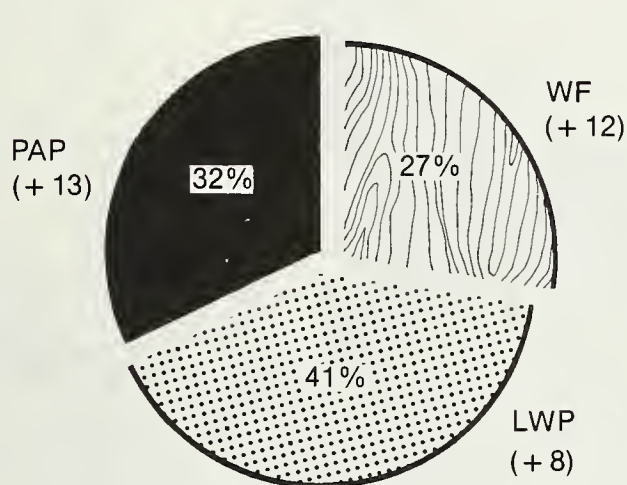
1980 Earnings—\$251 million



THE SOUTH

1980 Employment—620,567

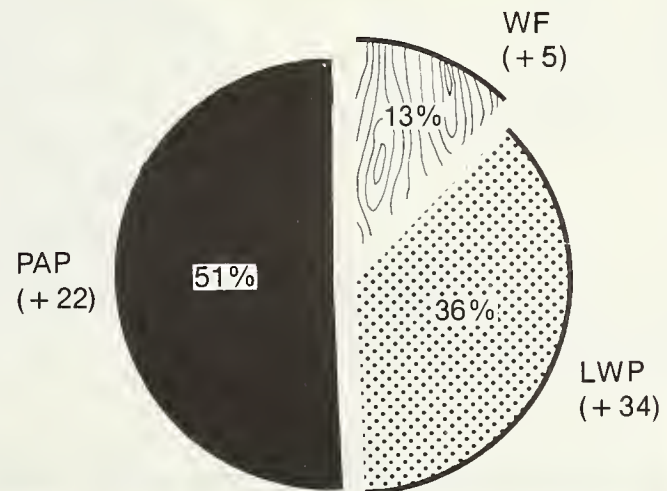
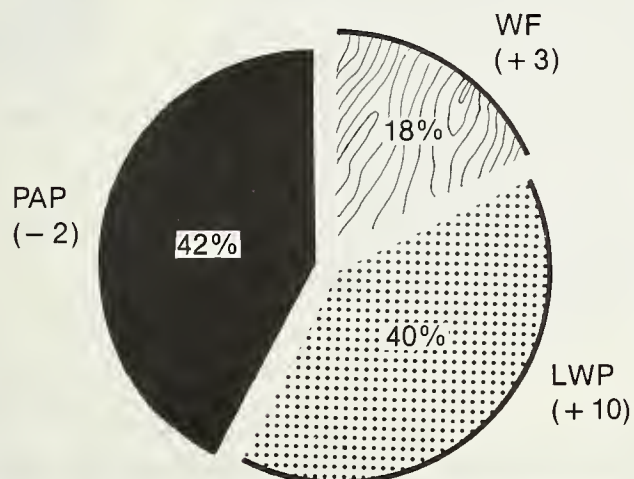
1980 Earnings—\$7.96 billion



UNITED STATES

1980 Employment—1,634,000

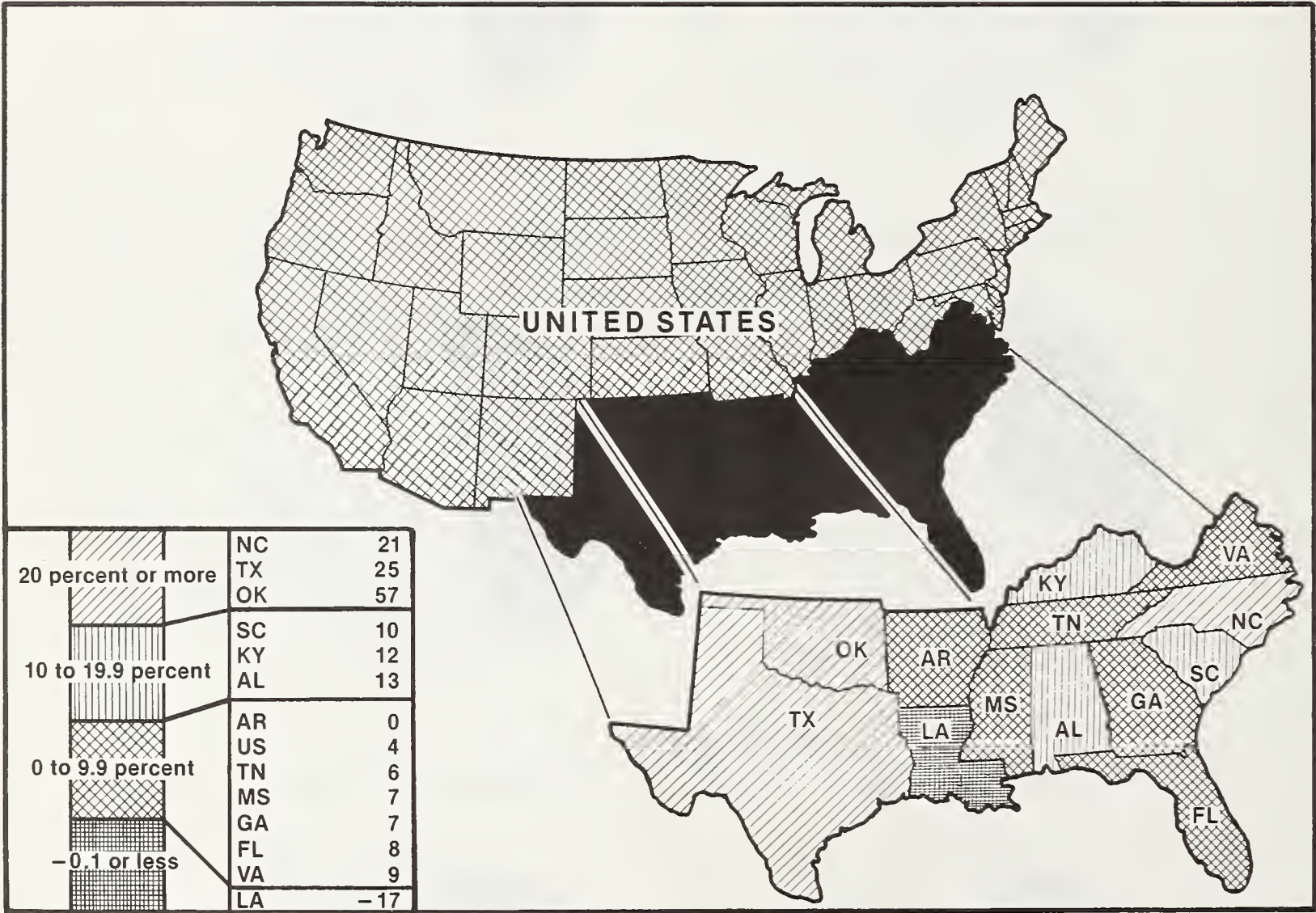
1980 Earnings—\$23.65 billion



Numbers in parentheses show percentage of change from 1970 to 1980.

Growth of Employment

With the exception of Arkansas and Louisiana, forest products industry employment in each of the Southern States from 1970 to 1980 grew faster than did the U.S. counterpart. Employment in two States—Oklahoma, and Texas—grew faster than the all-industry average of 22.3 percent. Employment growth in Kentucky's forest products industry was three times the national rate and ranked fifth among the 13 Southern States.

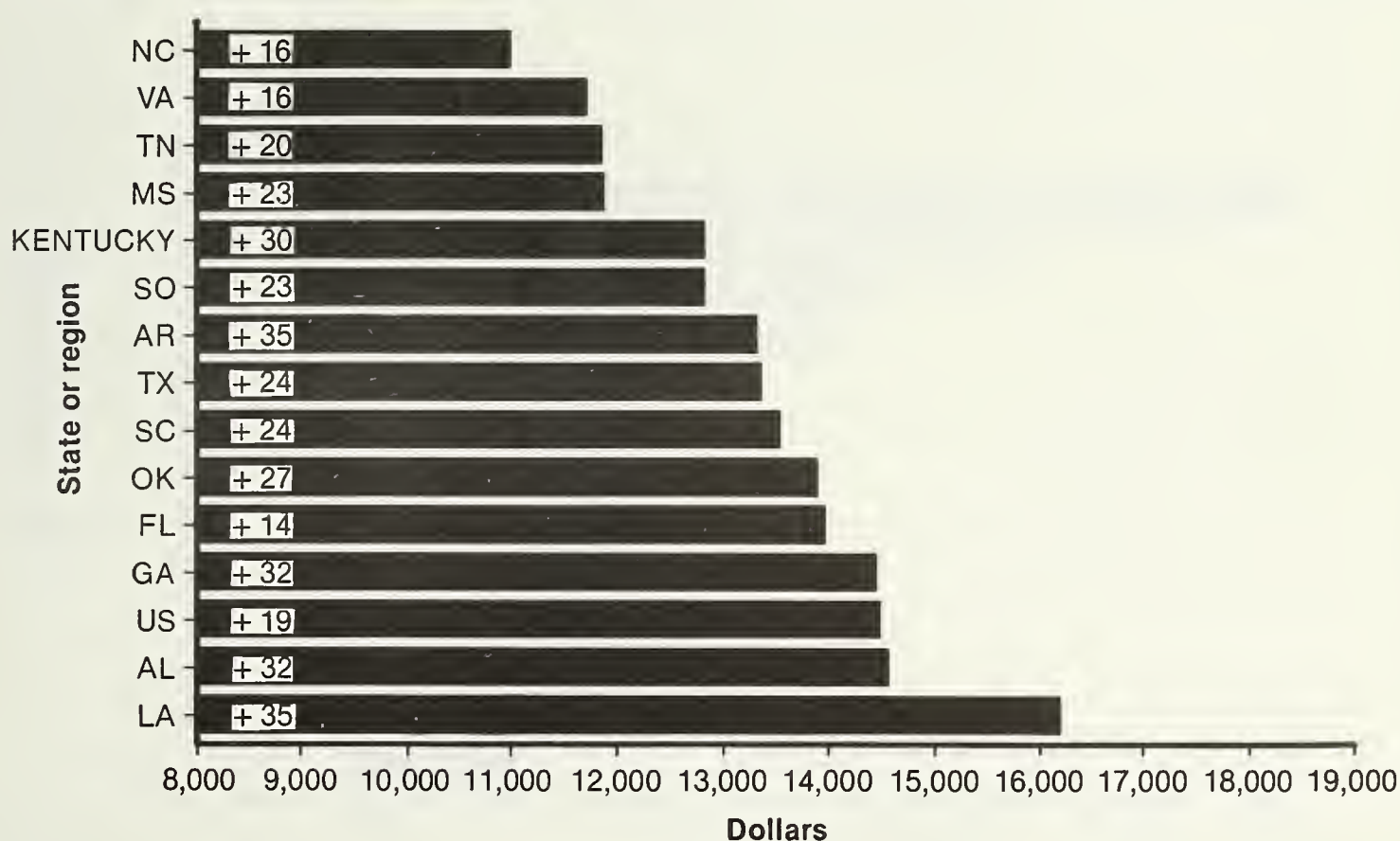


Average Annual Earnings

Average annual earnings per worker in the forest products industry differed significantly by State in 1980: Approximately \$5,000 separated the State with the highest—Louisiana—from the State with the lowest—North Carolina. Paper and allied products, which has traditionally paid higher wages than have other forest products industries, dominated Louisiana's forest products industry. Wood furniture, which has paid lower average wages, dominated North Carolina's industry.

Average annual forest products industry earnings in Kentucky's forest products industry were nearly the same as for the South, but less than for the Nation. The latter comparison is particularly significant with regard to paper and allied products: For this segment of the forest products industry, Kentucky's earnings were 11 percent less than the average for the Nation. From a cost standpoint, this differential provides Kentucky with a comparative advantage in a very competitive industry.

Generally speaking, paper and allied products dominated the forest products industry in the States with the highest average annual earnings. This relationship reflects higher job skills and unions in the paper industry. Wages, by and large, were the lowest in those States where labor-intensive wood furniture was more important.



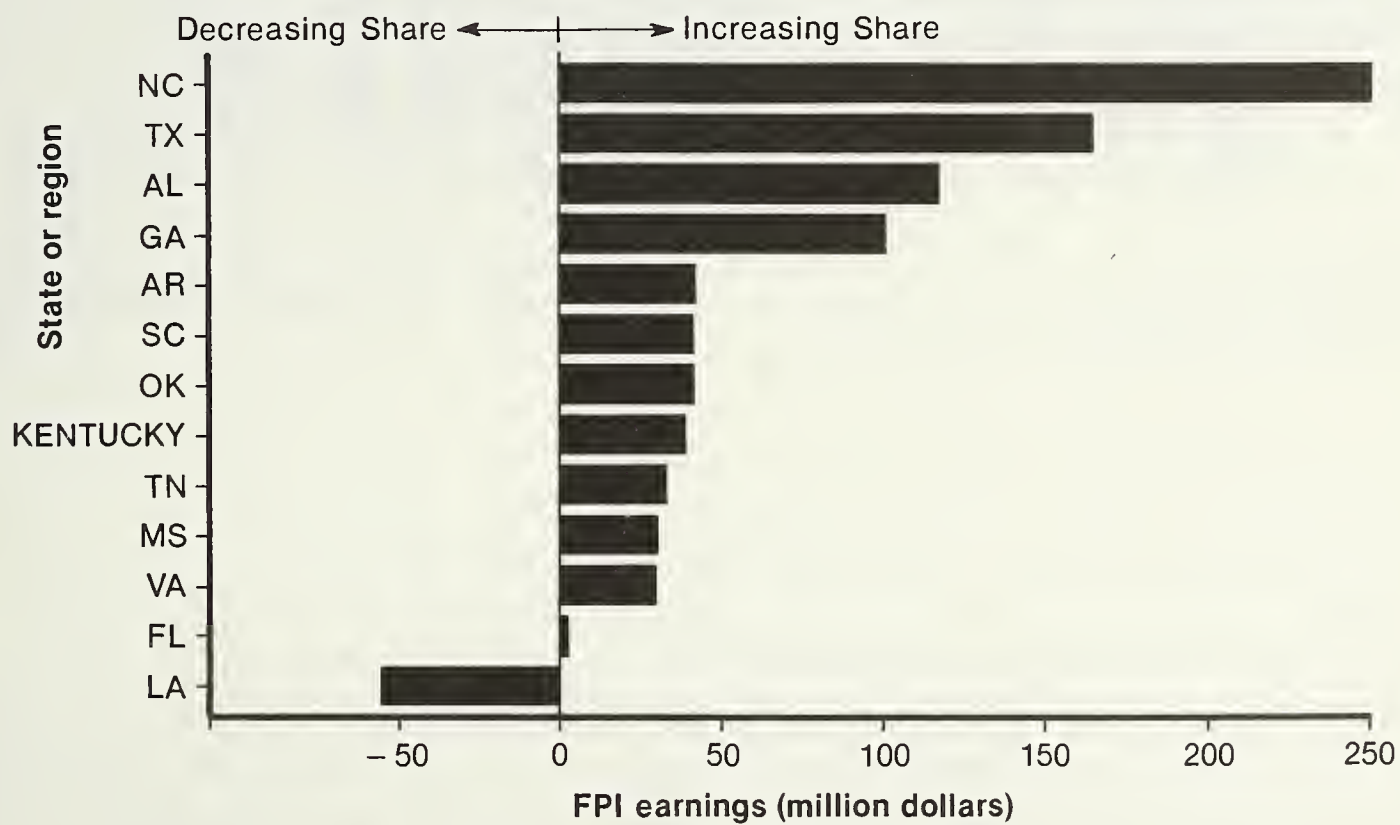
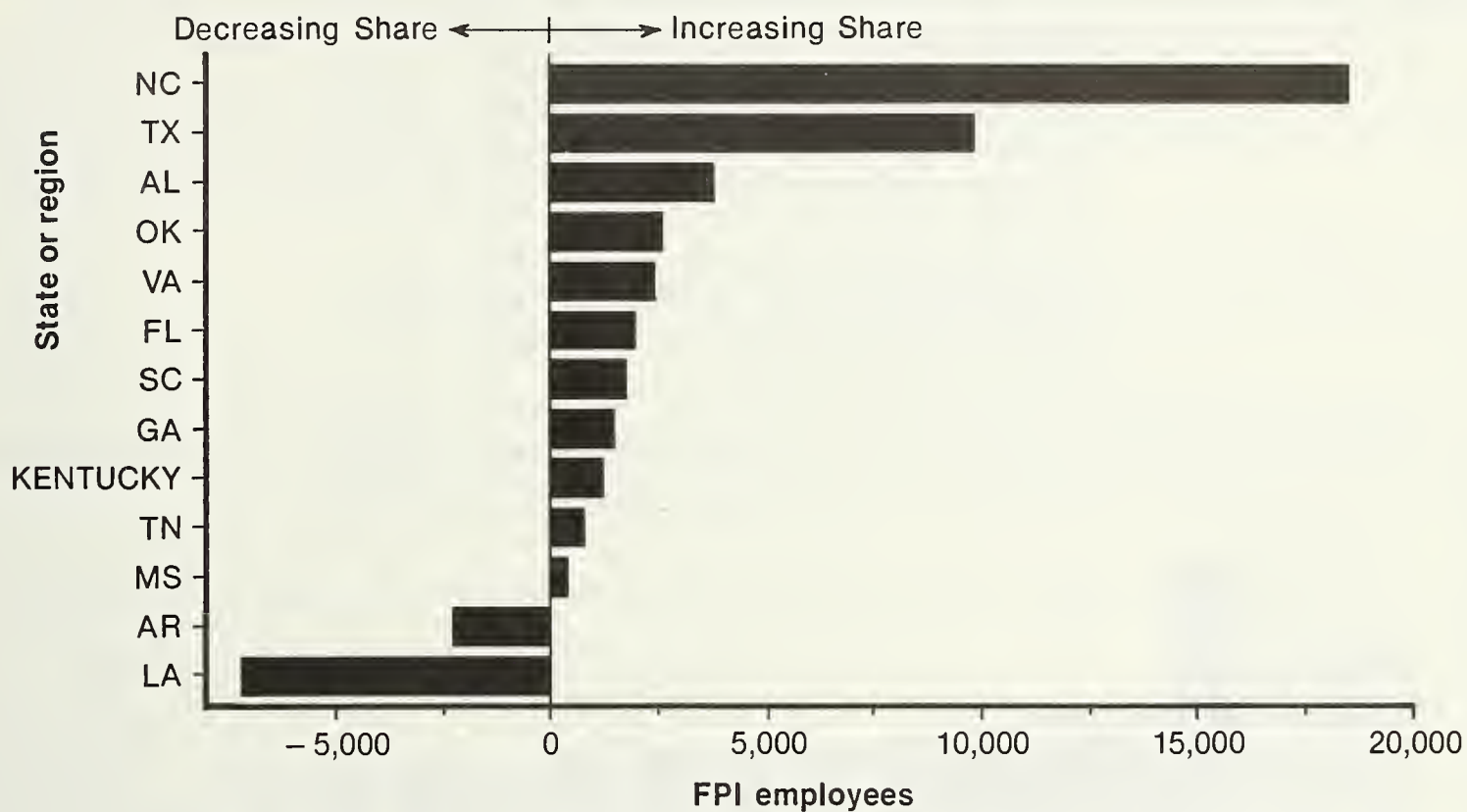
Numbers in bars show percentage of change from 1970 to 1980.

Shift in Employment and Earnings

The regional shift shows how much more or less employment and earnings a State would have had in the forest products industry in 1980 had the industry grown at the national rate. For example, Kentucky had approximately 1,200 more employees in 1980 than it would have had if its forest products industry had grown at the national rate.

Between 1970 and 1980, total employment in the forest products industry increased in every Southern State except Louisiana and Arkansas. Moreover, all but these two States increased their share of the Nation's forest products industry employment, and all States except Louisiana increased their share of earnings.

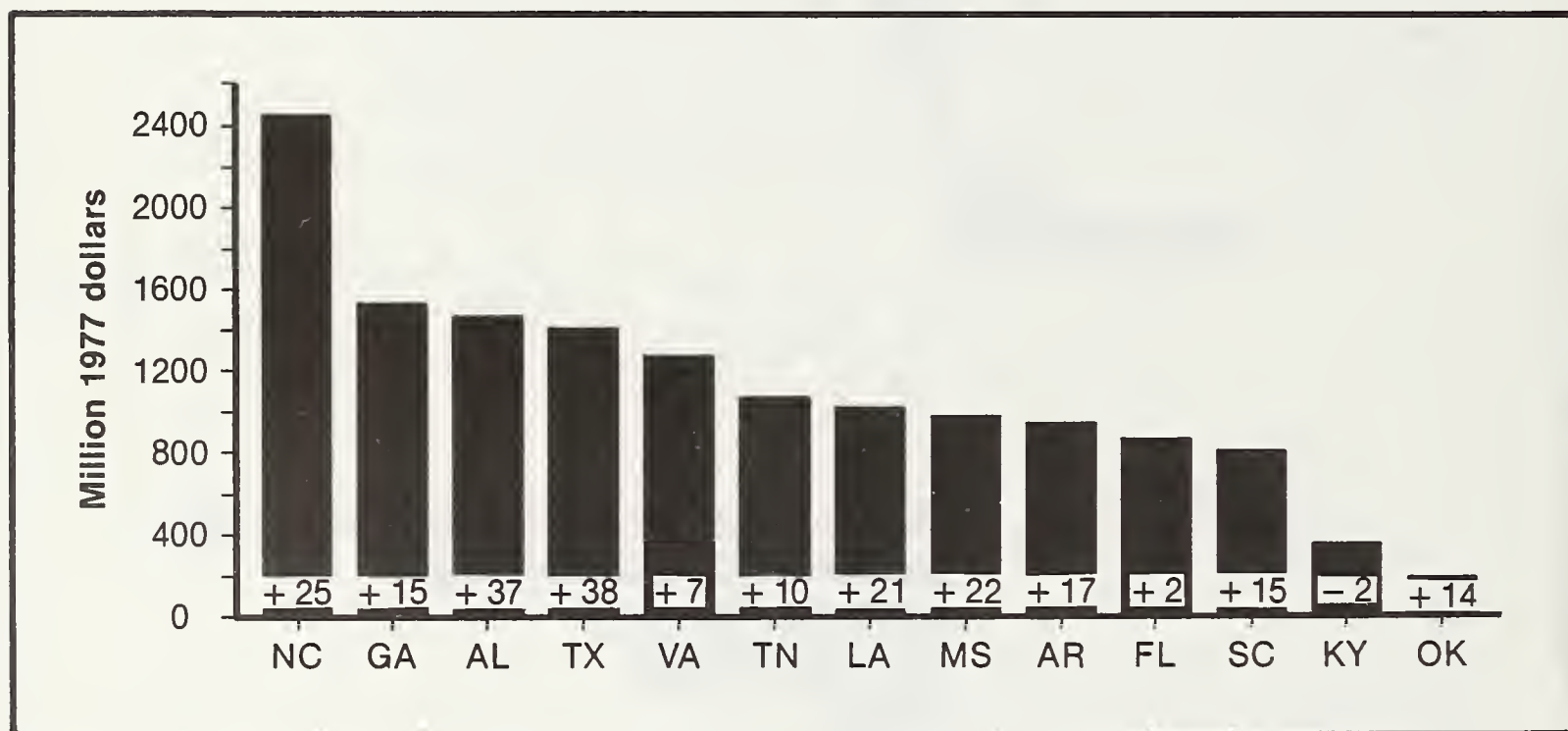
Increased shares of employment and earnings reflect the comparative advantage the South's forest products industry enjoyed over this industry in the rest of the Nation. Several factors (for example, relatively lower labor costs, lower raw materials costs, and closer proximity to markets) might account for a region's comparative advantage, although adverse trends with respect to one factor need not reduce a region's advantage. In the case of the South, for instance, increasing labor costs need not adversely affect its comparative advantage if increased capital or labor productivity offsets higher labor costs.



Value Added by the Forest Products Industry

In 1977, the forest products industry of North Carolina produced more value added than that of any other State in the South. Georgia was second among the 13 Southern States, followed by Alabama. Texas was not only one of the leading states in terms of total value added, it also led the South in terms of the change in value added between 1972 and 1977. Kentucky's forest products industry produced less value added in 1977 than in 1972. This can be attributed to the decline in secondary processing during the 1970's.^{2/} Later we shall see that its gain in productivity exceeded all but four Southern States.

^{2/} McCoy, Daniel R., and Sun Joseph Chang. The secondary wood-using industries in Kentucky: an economic analysis. Agric. Exp. Stn. Bull. 719. Lexington, KY: University of Kentucky, Department of Forestry; 1983. 68 p.



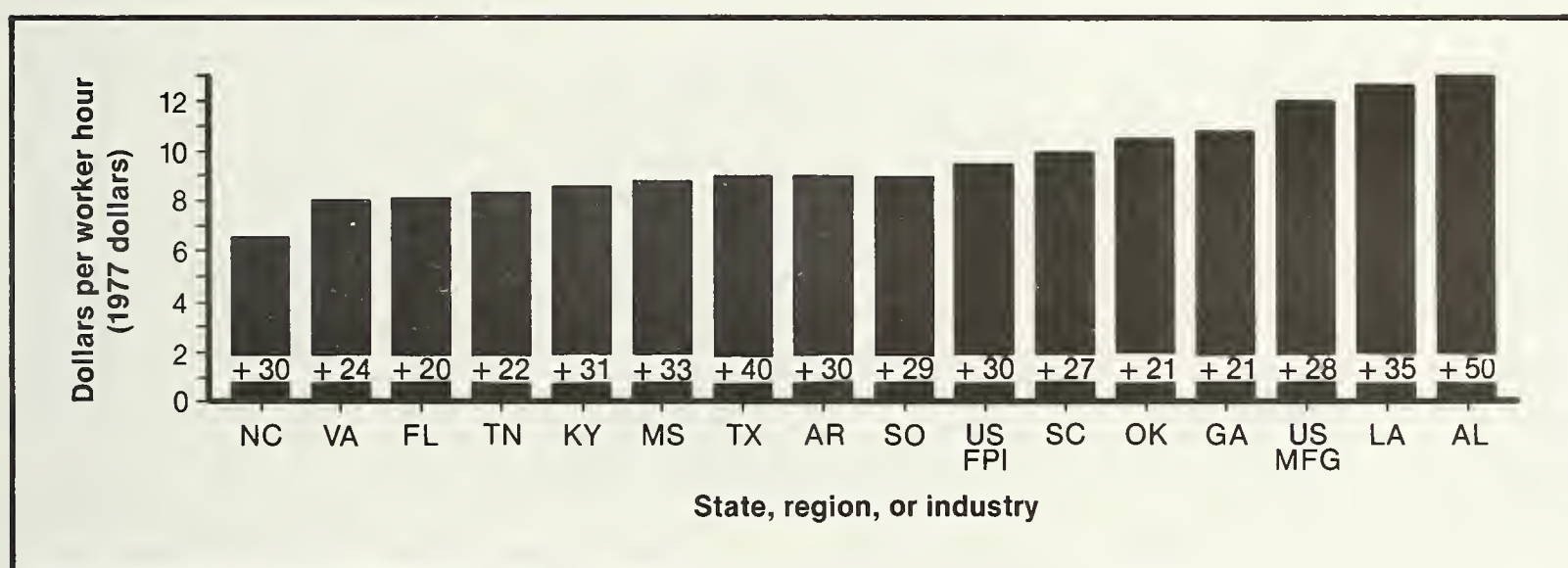
Numbers in bars show percentage of change from 1972 to 1977.

Capital Productivity

The paper and allied products, which is more capital-intensive and, therefore, more susceptible to technological change than other forest products industries, exhibited the highest productivity within the forest products industry. Wood furniture, on the other hand, is the most labor-intensive of the three. North Carolina, for example, produced more value added than any other state in the South, but the productivity of its forest products industry in 1977 was the lowest. This reflects the role of labor-intensive wood furniture in North Carolina.

Increases in productivity exceeded increases in payroll per worker between 1972 and 1977 for all the Southern States. This relationship is in part responsible for the South's comparative advantage in the forest products industry.

Between 1972 and 1977, the productivity of Kentucky's forest products industry increased by nearly one-third. This rate of change exceeded the average for all Southern States as well as that for all U.S. manufacturing. Kentucky tied for fifth place among the 13 Southern States.



Numbers in bars show percentage of change from 1972 to 1977.

Acknowledgment

Many helpful suggestions of several reviewers were incorporated in this research paper. This project was partially funded by the USDA Forest Service, Resource Program and Assessment Staff, State and Private Forestry, Area Planning and Development, State Planning for Forest Resources.

Appendix 1 Tables

Table 1—Total labor and proprietorial employment and income, by industry, Kentucky, 1980^{1/}

Industry number	Industry	Employees	Total income
		<i>Number</i>	<i>Thousand 1977 dollars^{2/}</i>
Wage and salary			
1	Agriculture	26,201	485,259
2	Agricultural services, forestry, and fisheries	6,067	52,809
3	Coal mining	47,319	1,188,830
4	Oil and gas extraction	2,877	60,659
5	Metal mining	23	484
6	Nonmetallic minerals	2,525	33,985
7	Construction	57,926	955,830
8	Food and kindred products	21,793	326,085
9	Tobacco	10,280	199,442
10	Textile mill production	6,540	58,701
11	Apparel and other textiles	27,743	206,556
12	Paper and allied products ^{3/}	7,364	110,681
13	Printing and publishing	14,390	180,844
14	Chemical and allied products	15,767	305,004
15	Petroleum refining	3,686	102,507
16	Rubber and miscellaneous plastics	9,670	146,066
17	Leather and leather products	4,041	30,753
18	Lumber and wood products, except mobile homes ^{2/}	9,306	108,558
19	Mobile homes	76	887
20	Wood furniture ^{3/}	2,869	31,380
21	Other furniture and fixtures	2,332	25,507
22	Stone, clay and glass products	9,270	136,795
23	Primary metals	18,534	413,474
24	Fabricated metals	18,490	260,510
25	Machinery, excluding electrical	39,057	652,029
26	Electrical machinery	35,766	535,652
27	Transportation equipment except motor vehicle	1,875	27,236
28	Motor vehicles	9,877	244,259
29	Ordnance ^{4/}	0	0
30	Instruments and related equipment	3,571	40,449
31	Miscellaneous manufacturing	4,060	43,128
32	Railroad transportation	16,612	314,628
33	Trucking and warehousing	16,672	315,044
34	Local transit	1,810	21,390
35	Air transportation	1,763	31,925
36	Pipeline transportation	168	3,426

See footnotes at end of table.

Table 1—Total labor and proprietorial employment and income, by industry, Kentucky, 1980 ^{1/} (continued)

Industry number	Industry	Employees	Total income
		Number	Thousand 1977 dollars ^{2/}
Wage and salary			
37	Transportation services	1,105	17,859
38	Water transportation	1,976	32,400
39	Communications	16,457	288,908
40	Electrical, gas, and sanitation services	13,459	247,013
41	Wholesale trade	61,834	883,139
42	Retail trade	198,980	1,525,613
43	Banking	20,121	215,121
44	Other credit agencies	8,892	125,154
45	Insurance	16,111	251,013
46	Real estate and combinations	8,096	89,376
47	Hotel and other lodging	12,249	75,687
48	Personal, miscellaneous business, and repair services	35,620	364,786
49	Auto repair service	6,188	85,257
50	Amusement	7,946	51,757
51	Motion pictures	1,540	7,985
52	Private households	26,574	67,628
53	Medical and other health	75,263	946,218
54	Private education	10,482	74,896
55	Nonprofit organizations	37,220	213,611
56	Miscellaneous services	12,774	335,851
57	Federal civilian	39,382	544,189
58	Federal military	54,022	401,695
59	State and local government	184,100	1,681,002
Proprietorial			
60	Farm proprietors	121,990	386,822
61	Nonfarm proprietors	116,728	1,195,477
62	Total	1,545,429	17,759,229

^{1/} Source of data for this table for Kentucky, other States of the South, and the United States: unpublished data, U.S. Department of Commerce, Regional Economics Measurements Division, Regional Economic Information System (REIS), Washington, DC, 1982. Unpublished data used by the U.S. Department of Commerce in preparing their *County Business Patterns* (CBP) series on employment and payroll were used to differentiate wood-related from nonwood-related employment and earnings. For example, CBP data were used to separate mobile homes (no. 19, above) from the lumber and wood products (no. 18) industry. Wood furniture (no. 20) was similarly separated from other furniture and fixtures (no. 21).

^{2/} The Personal Consumption Expenditures (PCE) deflator, 1977 = 100, was used to deflate nominal dollars.

^{3/} The forest products industry is comprised of (1) lumber and wood products (SIC 24), except mobile homes (SIC 2451); and (2) wood furniture manufacturing (SIC 2511, 2512, 2517, 2521, 2541) and paper and allied products (SIC 26).

^{4/} Included with fabricated metals and other related industries.

Table 2—Calculation of 1980 dependency indexes for Kentucky
(In percent)

Industry	Employment		Kentucky excess employment ^{1/}	Dependency index ^{2/}
	Kentucky	United States		
Agriculture	1.96	1.46	0.50	3.27
Agricultural services, forestry, and fisheries	.45	.62	—	—
Farm proprietors	9.14	3.03	6.11	39.87
Coal mining	3.55	.27	3.27	21.34
Oil and gas extraction	.22	.60	—	—
Metal mining	0	.11	—	—
Nonmetallic minerals	.19	.14	.05	.34
Construction	4.34	4.74	—	—
Food and kindred products	1.63	1.87	—	—
Tobacco	.77	.07	.70	4.54
Textile mill production	.49	.93	—	—
Apparel and other textiles	2.08	1.39	.69	4.51
Paper and allied products	.55	.76	—	—
Printing and publishing	1.08	1.37	—	—
Chemical and allied products	1.18	1.22	—	—
Petroleum refining	.28	.22	.06	.37
Rubber and miscellaneous plastic	.72	.80	—	—
Leather and leather products	.30	.26	.04	.28
Lumber and wood products, except mobile homes	.70	.71	—	—
Mobile homes	.01	.05	—	—
Wood furniture	.21	.32	—	—
Other furniture and fixtures	.17	.19	—	—
Stone, clay, and glass products	.69	.73	—	—
Primary metals	1.39	1.26	.13	.83
Fabricated metals	1.39	1.77	—	—
Machinery, excluding electrical	2.93	2.73	.19	1.27
Electrical machinery	2.68	2.31	.37	2.39
Transportation equipment except motor vehicle	.14	1.21	—	—
Motor vehicles	.74	.87	—	—
Ordnance	0	0	—	—
Instruments and related equipment	.27	.77	—	—
Miscellaneous manufacturing	.30	.47	—	—
Railroad transportation	1.24	.58	.66	4.31
Trucking and warehousing	1.25	1.40	—	—
Local transit	.14	.29	—	—
Air transportation	.13	.50	—	—
Pipeline transportation	.01	.02	—	—
Transportation services	.08	.22	—	—
Water transportation	.15	.23	—	—
Communications	1.23	1.48	—	—
Electrical, gas, and sanitation services	1.01	.90	.11	.69
Wholesale trade	4.63	5.79	—	—
Retail trade	14.91	16.50	—	—
Banking	1.51	1.72	—	—
Other Credit Agencies	.67	.99	—	—

See footnotes at end of table.

Table 2—Calculation of 1980 dependency indexes for Kentucky
(In percent)

Industry	Employment		Kentucky excess employment ^{1/}	Dependency index ^{2/}
	Kentucky	United States		
Insurance	1.21	1.89	—	—
Real estate and combinations	.61	1.16	—	—
Hotel and other lodging	.92	1.20	—	—
Personal, miscellaneous				
business, and repair services	2.67	4.69	—	—
Auto repair service	.46	.63	—	—
Amusement	.60	.84	—	—
Motion pictures	.12	.24	—	—
Private households	0	0	—	—
Medical and other health	5.64	5.71	—	—
Private education	.79	1.47	—	—
Nonprofit organizations	2.79	3.01	—	—
Miscellaneous services	.96	1.63	—	—
Federal civilian	2.95	3.27	—	—
Federal military	4.05	2.68	1.37	8.92
State and local government	11.91	12.56	—	—
Nonfarm proprietors	8.75	7.66	1.08	7.06
Total ^{3/}	100.00	100.00	15.32	100.00

^{1/} U.S. employment minus Kentucky employment. Figures may not be exactly equal to Kentucky minus U.S. because of rounding. Dashes signify no excess employment.

^{2/} Individual industry excess employment expressed as a percent of Kentucky's total excess employment (sum of column 4).

^{3/} Sum of parts may not equal totals because of rounding.

Table 3—Value added, hours worked, payroll, and capital productivity,^{1/}
Kentucky forest products industry, 1977^{2/}

Industry	Value added	Payroll	Hours worked	Productivity	Productivity change, 1972-77
	--\$Million--		Million	\$VAMP per hour	Percent
Lumber and wood products	132.0	67.1	12.7	5.11	-8.77
Wood furniture	29.5	16.7	3.4	3.76	17.05
Paper and allied products	191.8	150.1	7.6	16.51	79.34

^{1/} Productivity equals value added minus payroll (VAMP), divided by hours worked. For a discussion of VAMP, see W. Charles Sawyer and Joseph A. Ziegler, 1980, "The use of VAMP shift as a predictive model." Unpublished paper presented at the annual meeting of the Western Regional Science Association, Monterey, California.

^{2/} Source: U.S. Bureau of the Census, Census of Manufacturing, for 1972 and 1977, Kentucky and the United States, available in 1976 and 1980, respectively. In the few instances where data were not available for some subindustry sectors, the distribution of the number of establishments was used to estimate nondisclosures.

Appendix 2
Kentucky Counties by
Substate Planning and
Development Districts

District code	Counties
1	Ballard, Calloway, Carlisle, Fulton, Graves, Hickman, Marshall, McCracken
2	Caldwell, Christian, Crittenden, Hopkins, Livingston, Lyon, Muhlenberg, Todd, Trigg
3	Daviess, Hancock, Henderson, McLean, Ohio, Union, Webster
4	Allen, Barren, Butler, Edmonson, Hart, Logan, Metcalfe, Monroe, Simpson, Warren
5	Breckinridge, Grayson, Hardin, Larue, Marion, Meade, Nelson, Washington
6	Bullitt, Henry, Jefferson, Oldham, Shelby, Spencer, Trimble
7	Boone, Campbell, Carroll, Gallatin, Grant, Kenton, Owen, Pendleton
8	Bracken, Fleming, Lewis, Mason, Robertson
9	Bath, Menifee, Montgomery, Morgan, Rowan
10	Boyd, Carter, Elliott, Greenup, Lawrence
11	Floyd, Johnson, Magoffin, Martin, Pike
12	Breathitt, Knott, Lee, Leslie, Letcher, Owsley, Perry, Wolfe
13	Bell, Clay, Harlan, Jackson, Knox, Laurel, Rockcastle, Whitley
14	Adair, Casey, Clinton, Cumberland, Green, McCreary, Pulaski, Russell, Taylor, Wayne
15	Anderson, Bourbon, Boyle, Clark, Estill, Fayette, Franklin, Garrard, Harrison, Jessamine, Lincoln, Madison, Mercer, Nicholas, Powell, Scott, Woodford

Schallau, Con H; Maki, Wilbur R.; Foster, Bennett B.; Redmond, Clair H.

Kentucky's forest products industry: performance and contribution to the state's economy, 1970 to 1980. Res. Pap. PNW-354. Portland, OR: U.S. Department of Agriculture, Forest Service, Pacific Northwest Research Station; 1986. 22 p.

Employment and earnings in Kentucky's forest products industry, like those of most Southern States, grew significantly between 1970 and 1980. In fact, Kentucky's share of the Nation's forest products employment and earnings increased during this period. In 1980, lumber and wood products accounted for the largest share of the industry's employment, but paper and allied products had more earnings. Furthermore, in 1977, pulp and allied products had higher productivity than either lumber and wood products, or wood furniture.

Keywords: Forest products industries, economics (forest products industries), Kentucky.

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